

THERAPIES USING HEMOPROTEINS

ABSTRACT OF THE DISCLOSURE

Herein it is shown that hemoproteins (e.g., *Ascaris* hemoglobin, myoglobin, flavohemoglobins) have NO-consuming and deoxygenase activities. The invention provides a method of reducing the concentration of oxygen and/or nitric oxide in a mammal. The method of the invention comprises administering a therapeutically effective amount of a hemoprotein having NO-activated deoxygenase activity or an enzymatically active fragment thereof to a mammal. The method can be used to treat a mammal having pathologically proliferating cells, such as a tumor. In one embodiment, the hemoprotein is administered to reduce the oxygen concentration of a tumor. In another embodiment, the hemoprotein is administered together with a cytotoxic agent to treat a mammal having a tumor. The invention also provides a method of enzymatically generating toxic reactive oxygen species in a mammal for therapeutic purposes. The method comprises administering a therapeutically effective amount of a hemoprotein to a mammal. The invention also provides a composition comprising a hemoprotein having deoxygenase activity or an enzymatically active fragment thereof and a physiologically acceptable carrier. In one embodiment, the composition further comprises a cytotoxic agent and/or a reducing agent. The invention further provides a method of treating a mammal infected with *Ascaris sp.*, comprising administering to said mammal a therapeutically effective amount of an inhibitor of NO synthase. The NO-consuming activity of a hemoprotein (e.g., a flavohemoglobin) can be used in a treatment where constriction of blood vessels is desirable, or where it is otherwise desirable to reduce NO concentration, as in inflammation.